

# EXHIBIT A

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA  
SAN FRANCISCO DIVISION

ORACLE AMERICA, INC.

Plaintiff,

v.

GOOGLE, INC.

Defendant.

Case No. 3:10-cv-03561-WHA

SUPPLEMENTAL EXPERT REPORT OF DR. GREGORY K. LEONARD

**HIGHLY CONFIDENTIAL  
SUBJECT TO PROTECTIVE ORDER**

**TABLE OF CONTENTS**

	<b><u>Page</u></b>
I. ASSIGNMENT .....	1
II. UPDATED DAMAGES CALCULATIONS .....	1
III. DR. COCKBURN’S METHODOLOGY FOR DETERMINING THE APPORTIONMENT PERCENTAGES FOR THE PATENTS-IN-SUIT.....	2
A. “Group and Value” Method.....	3
B. “Independent Significance” Method.....	8
IV. DR. COCKBURN’S ECONOMETRIC ANALYSIS AND THE CONJOINT SURVEY .....	9

## **I. ASSIGNMENT**

I previously submitted an expert report in this case, dated October 3, 2011 and as revised October 24, 2011 (“my First Report”). I incorporate that report by reference, and I still hold all of the opinions discussed in that report. I have been asked by counsel for Google, Inc. (“Google”) to provide additional opinions in light of the third Expert Report of Dr. Iain M. Cockburn, dated February 3, 2012 (“the Third Cockburn Report”).<sup>1</sup>

In the course of my analysis, I have reviewed the additional documents and other information listed in Appendix B to this report. I have also reviewed the Court’s Daubert rulings and the instructions therein regarding the damage calculations in this case. The citations in this report to documents and other information are not meant to be exhaustive.

## **II. UPDATED DAMAGES CALCULATIONS**

In the damages calculations in my First Report, I adopted Dr. Cockburn’s patent apportionment percentages, without endorsing them. In the Third Cockburn Report, Dr. Cockburn presents a revised range of patent apportionment percentages based on a new methodology. Although I have serious concerns about the validity of this new methodology, as discussed below, I have revised my damages calculations to use the lower end of Dr. Cockburn’s revised range of patent apportionment percentages (as discussed below, the upper end of Dr. Cockburn’s range is not supportable). Nothing else changed. See Exhibits 2 (Revised) and 3a (Revised) attached to this report. Damages based on the analysis of the Danger and handset manufacturer Java licenses (using the doubling scenario) are \$11.3 million based on US sales of

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<sup>1</sup> I understand that Oracle has dropped the ‘476 patent from this case, but Dr. Cockburn has not offered any new damages calculations excluding the ‘476 patent from his analysis. I reserve the right to respond to any revised damages calculations that Dr. Cockburn might submit that account for the fact that the ‘476 patent is no longer in the case.

Android handsets, \$3.8 million based on US sales of accused handsets only, and \$2.8 million based on US sales of accused handsets after July 20, 2010. Damages based on the analysis of the Google-Sun negotiation are \$6.2 million.

### **III. DR. COCKBURN'S METHODOLOGY FOR DETERMINING THE APPORTIONMENT PERCENTAGES FOR THE PATENTS-IN-SUIT**

Dr. Cockburn starts with the value that he claims Sun would have expected to generate from the proposed agreement with Google, apparently under the assumption that the parties would have expected to receive equal value from the proposed agreement. I note that there is no reason to believe this was necessarily the case; Sun may have expected to receive greater value (e.g., through Project Armstrong) than Google was expecting to receive. It is the value that Google was expecting to receive that matters for the reasonable royalty analysis.

From this overall value, Dr. Cockburn subtracts the value of assets and services Sun provided to Google that are not related to the patents or copyrights. He identifies only one such service: the engineering efforts that Sun would have expected to incur to meet its obligations under the agreement. However, in subtracting out the costs of these engineering efforts, Dr. Cockburn confuses cost with value. The question is not how much the engineering efforts cost Sun, but instead how much value these engineering efforts would have provided to Google. To see why this is the case, consider the patents-in-suit. Sun would have incurred zero cost to provide a license to these assets to Google (since the technology was already developed). Yet, according to Dr. Cockburn, they had substantial value to Google. It would be a mistake to consider the cost of providing the asset rather than the value of the asset to Google. Thus, in subtracting out only the costs (rather than the value) of the Sun engineering efforts from the total

value of the proposed agreement, Dr. Cockburn subtracts out too little and overstates the value of the patents-in-suit and copyrights-in-suit.

Dr. Cockburn finds that Sun provided nothing, other than the engineering efforts, the patents, and the copyrights, that had any value to Google. This seems contrary to his positions in previous reports where he, for example, claimed that Sun could have provided a time-to-market advantage and connections to OEMs and developers that he says would have had value to Google.<sup>2</sup>

Having identified the portion of the value of the proposed agreement that relates to the patents and copyrights, Dr. Cockburn presents two alternative methods for determining the apportionment percentages that identify the portion of the overall patent and copyright value that is due to the patents-in-suit and copyrights-in-suit, respectively: the “Group and Value” method and the “Independent Significance” method.

#### **A. “Group and Value” Method**

Under this method, Oracle engineers identified 569 Sun patents that they believed would have applied to Android and, therefore, would have been a part of the proposed license agreement between Sun and Google. Each of the 569 patents was given a ranking of 1, 2, or 3, with a ranking of 1 given to the most valuable patents. Oracle engineers also identified 22 technology groups covered by the 569 patents, and then ranked the technology groups from 1 to 22 based on the benefits of speed, startup, footprint, and security that they would be expected to

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<sup>2</sup> For example, Cockburn Second Report ¶ 22 (“time to market was very important to Google and...concluding a deal with Sun would dramatically ‘accelerate’ Android”); fn. 418 (quoting a document that notes Google could “leverage[e] Sun’s ability to aid OEMs and carriers in productization and deployment”); Cockburn Second Report ¶ 417 (“Google has used the infringed patents as *part* of a concerted effort to tap a huge ecosystem of Java developers”, emphasis added, indicating that the value associated with Java developers was not entirely tied to the patents-in-suit).

provided to a smartphone platform. Then, each of the 569 patents was assigned to one of the 22 unique technology groups. Dr. Cockburn focused on the group of 22 most highly ranked patents, which included three of the patents-in-suit ('104/'205/'720), arbitrarily defined as the patents with a ranking of 1 that are part of a technology group with a ranking of 1, 2, or 3.

Dr. Cockburn used the results of three studies of the distribution of patent values to determine the percentage of the total value of the 569 patents contributed by the '104/'205/'720 patents-in-suit. In doing this, he assumes either:

- The '104/'205/'720 patents-in-suit were the three most important patents in the entire Sun portfolio, thereby representing 0.5% ( $=3/569$ ) of the entire portfolio in terms of the number of patents and between 30.0% to 67.9% of the total value of the entire portfolio; or
- The 22 most highly ranked patents were of equal importance and the most important patents in the entire Sun portfolio, thereby representing 3.9% ( $=22/569$ ) of the entire portfolio in terms of the number of patents and between 67.9% and 91.9% of the total value of the entire portfolio. Then, assuming that the '104/'205/'720 patents-in-suit represented 3/22 of the value of the top 22 most highly ranked patents, Dr. Cockburn determined that the '104/'205/'720 patents-in-suit represented between 9.3% ( $=(3/22)*67.9\%$ ) and 12.5% ( $=(3/22)*91.9\%$ ) of the total value of the entire portfolio.

From the '104/'205/'720 patents-in-suit, Dr. Cockburn extrapolated to the three remaining patents-in-suit ('476/'520/'702) (assuming these three patents were worth 17.4 percent of the '104/'205/'720 patents) as well as to the copyrights-in-suit (assuming these were worth 50 percent of the six patents-in-suit).

There are a number of problems with Dr. Cockburn's methodology. First, his use of the results of the three studies of the distribution of patent values assumes that the 569 Sun patents follow the same distribution of value as the patents that were the subject of the three studies. However, there are significant differences between the 569 Sun patents, on the one hand, and the patents that were used in the three studies, on the other:

- The 569 Sun patents were owned by a single company (Sun), while the patents in the three studies were owned by numerous companies. Dr. Cockburn provides no support for his implicit assumption that the distribution of patent value within a single company's portfolio is the same as the distribution of patent value across all patents and all companies.
- One of the three studies analyzed European patents (PatVal (2005), p. 7) and a second studied German patents (Harhoff (2002), p. 1348), while the patents-in-suit and the other 563 Sun patents are US patents. One of the papers states, "Some of the mean values should be surprising to readers familiar with citation indicators from the US patent system. As reported in a previous paper (Harhoff, et al., 1999), we find that the citation counts, both in the German and the European system, are spectacularly low by USPTO standards" (Harhoff (2002), p. 1355). This suggests that Dr. Cockburn's implicit assumption that the distribution of value for US patents is the same as the distribution of value for European patents is incorrect.<sup>3</sup>
- The one study that analyzed US patents attempted to infer value from maintenance fees (Barney (2002), p. 328). This method works by recognizing that, if a patent owner was willing to pay the maintenance fees for a patent, the patent's value must have exceeded those fees. However, since the fees are fairly low (in the thousands of dollars<sup>4</sup>), very little can be reliably inferred about the distribution of high value (hundreds of millions of dollars) patents from observing payment of maintenance fees that never exceed thousands of dollars. Thus, Dr. Cockburn extrapolates substantially beyond the observed data.
- The studies examined patents from a wide range of industries, not just software.<sup>5</sup> However, Dr. Cockburn applies the overall distribution, which reflects a mix of industries, to the 569 Sun patents, which are all associated with the software industry. Dr. Cockburn provides no support for his implicit assumption that distribution of patent value in the software industry is the same as in the average industry studied in the three papers.

<sup>3</sup> See also G. Silverberg and B. Verspagen, "The Size Distribution of Innovations Revisited: An Application of Extreme Value Statistics to Citation and Value Measures of Patent Significance," Journal of Econometrics (2007), cited by Dr. Cockburn, which notes "legal and other institutional differences between the two systems" (p. 321).

<sup>4</sup> Maintenance fees are paid every four years and escalate progressively from \$880 to maintain a patent in force beyond the fourth year, to \$2,020 to maintain a patent in force beyond the eighth year, to \$3,100 to maintain a patent in force beyond the twelfth year (Barney (2002), p. 324).

<sup>5</sup> "The survey considered all patent grants with a 1977 German priority date which were renewed to full term, i.e., expired during 1995" (Harhoff (2002), p. 1348). "Our population is composed of all EPO patents with priority date between 1993 and 1997 and the address of the first in one of our six countries" (PatVal (2005), p. 7). "PTO maintenance data for a sample population of approximately 70,000 patents issued in 1986" (Barney (2002), p. 327).



- The studies examine patents issued at a different time period than the patents-in-suit: Barney (2002) examines patents issued in 1986 (p. 328), Harhoff (2002) examines patents issued in 1977 (priority date; p. 1348), and PatVal (2005) examines patents issued between 1993 and 1997 (p. 7). Changes in patent system structure and legal framework have likely changed the value of patents over time.

Second, the patent value distributions from the three papers differ significantly from each other, as might be expected given that the papers are based on patents with different mixes of industries and countries. This can be seen in Exhibit 34 of the Cockburn Report. As a result, Dr. Cockburn needs to provide a reliable basis to determine which of the three distributions is the best fit for the 569 Sun patents. Even then, the “best fit” among the three may well be a poor fit in an absolute sense and thus not provide a reliable basis for Dr. Cockburn’s subsequent calculations. Dr. Cockburn does no analysis to demonstrate that any of the three papers is a sufficiently reliable fit to the 569 Sun patents to support the use to which Dr. Cockburn puts it.

Third, there exists a problem with sample selection bias in Dr. Cockburn’s procedure. He is implicitly assuming that the 569 Sun patents represent 569 random draws from the distribution of patent values. However, the list of 569 patents was created by Oracle engineers who specifically went through all of the Sun patents, trying to determine which ones would be valuable for Android.<sup>6</sup> In other words, the Oracle engineers have already selected out the supposedly more valuable patents and thus the 569 patents are not random draws from the distribution of all patents; instead, they would tend to fall in the upper part of the distribution, contrary to Dr. Cockburn’s assumption. In addition, some of the 569 patents may well be related to each other, so that their values are not independent, again contrary to Dr. Cockburn’s analysis.

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<sup>6</sup> I understand that four of the five Oracle engineers that participated in the selection and ranking of the 569 patents had previously been involved in analyzing the patents-in-suit prior to or during this litigation. This introduced bias into their ranking of the 569 patents, with the likely result being that the engineers provided higher rankings to the patents-in-suit, which they had previously analyzed. In fact, one of the four engineers admitted in his

Fourth, Dr. Cockburn ignored information that suggests that the ‘104/’205/’720 patents-in-suit are not particularly highly valued within the subset of the 22 patents that are supposedly the most valuable among the 569 Sun patents.<sup>7</sup> I have examined the number of “forward citations” for each of the 22 patents. Forward citations have been recognized by economists as an indicator of patent value. Indeed, the Harhoff et al., (2002) paper, one of the three studies relied on by Dr. Cockburn, fits an econometric model that relates patent value to forward citations and finds a positive relationship. Of the 22 patents, the ‘104/’205/’720 patents-in-suit rank 10th (‘205), 11<sup>th</sup> (‘104), and 17<sup>th</sup> (‘720) in terms of number of forward citations. In other words, they are in the middle of the pack or worse. Even more informative is the number of forward citations for a patent relative to the average number of forward citations for a patent in the same class as the patent in question. By this relative measure, the ‘104/’205/’720 patents-in-suit rank 10th (‘720), 11<sup>th</sup> (‘205), and 17<sup>th</sup> (‘104) among the 22 patents—again, in the middle of the pack or worse. The information on forward citations suggests that the ‘104/’205/’720 patents-in-suit are not the three most valuable patents of the 22, as Dr. Cockburn assumes in determining the top of the range for his apportionment percentage. Instead, the information on forward citations suggests that the ‘104/’205/’720 patents-in-suit are worse than the middle of the set of 22 patents. This, in turn, suggests that only the lower bound on Dr. Cockburn’s range has any support.

Fifth, Dr. Cockburn has no objective basis for his extrapolation from the ‘104/’205/’720 patents-in-suit to the other three patents-in-suit. In particular, he provides no support for his

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deposition that he relied on the previous analysis of the patents-in-suit in assigning their rankings. (See Plummer Dep. at 101:25-102:14)

<sup>7</sup> Dr. Cockburn inappropriately mixes the real world with the hypothetical world of the hypothetical negotiation when he argues that “Google’s infringement of [the ‘104/’205/’720] patents...indicates that they are likely to be the three most valuable patents to Android” (¶ 410). In the real world, Google had no knowledge of the patents at that time, nor did Google believe it was infringing any patents.

breakdown of the value of the total value of the patents-in-suit to each individual patent-in-suit. The figures in Dr. Cockburn's Exhibit 31 are based on Dr. Cockburn's subjective assessment.

Sixth, Dr. Cockburn has no objective basis for his extrapolation from the six patents-in-suit to the copyrights. He claims that the value of the copyrights is 50 percent of the value of the six patents-in-suit, but his only support for this 50 percent figure is a result from the conjoint study that is too narrow in scope (concerning one potential source of value from the copyrights with respect to consumer demand) to support the broad use to which Dr. Cockburn puts it (the overall value of the copyrights from all sources). Moreover, the conjoint study is unreliable as I have discussed elsewhere.

#### **B. "Independent Significance" Method**

Under this method, Dr. Cockburn reviewed the record and then applied his judgment to conclude that the apportionment percentage for the patents-in-suit should be 25 percent. This method is not replicable by anyone other than Dr. Cockburn and thus is entirely subjective. I conclude that this method does not provide a valid scientific basis for determining the apportionment percentage. Dr. Cockburn's "methodology" here bears a resemblance in its unreliability to the "methodology" of the "25% Rule" that was found to be unreliable by the Federal Circuit in *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F.3d 1292 (Fed. Cir. 2011).

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In addition to these problems, Dr. Cockburn's approach to damages suffers from the flaws I discussed in my October 3, 2011 report, including the failure to consider Google's non-infringing alternatives.

It is notable that Dr. Cockburn's conclusion on the apportionment to the patents-in-suit—\$69.5 million to \$223.7 million—is inconsistent with the result of applying his methodology to other information from the record.<sup>8</sup> For example, Oracle valued all of the Sun intellectual property at \$505 million, and the Sun IP included over 14,000 patents.<sup>9</sup> Using Dr. Cockburn's own methodology, even if the '104/'205/'720 patents-in-suit were the most valuable of the 14,000 patents in the portfolio, and the 14,000 patents accounted for all of the value of the Sun IP, the '104/'205/'720 patents-in-suit would be worth only 3.06 percent of the \$505 million, or \$15.4 million.<sup>10</sup> Increasing this figure by 17.4 percent to reflect Dr. Cockburn's assessment of the value of the other three patents-in-suit yields a total of \$18.1 million for the six patents-in-suit. This \$18.1 million represents the total value of these patents. The reasonable royalty in this case must be less than the total value of the patents-in-suit. Yet, the amount that Dr. Cockburn apportions to the patents-in-suit is three to twelve times larger than this generous estimate of the total value of the patents-in-suit based on Dr. Cockburn's own methodology and Oracle's valuation of Sun's IP. This underscores how unreliable Dr. Cockburn's damages calculation is.

#### **IV. DR. COCKBURN'S ECONOMETRIC ANALYSIS AND THE CONJOINT SURVEY**

In my First Report and in a previous declaration, I discussed flaws in Dr. Cockburn's econometric analysis and the conjoint survey. I incorporate those documents by reference.

In his Rebuttal Report and Third Report, Dr. Cockburn has attempted to address some of my criticisms. In each case, he is wrong. For example,

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<sup>8</sup> Third Cockburn Report ¶ 5. These figures are before Dr. Cockburn's downward adjustments for alleged infringement in the US, marking, and accused products.

<sup>9</sup> OAGOOGL0100030813-815.

<sup>10</sup> Using Dr. Cockburn's Pareto specifications using the PatVal(2005) data, I calculated the value for the top 0.02% (= 3/14,000) of the patents. According to this model, the value of the top three patents is estimated to be 3.059% of the total value of the portfolio. See the Third Cockburn Report, Exhibits 33-34 Backup.

- Dr. Cockburn claims that the estimation technique I used is different than his. He is wrong, as straightforward algebra shows.
- Dr. Cockburn continues to claim that it is valid econometric procedure to drop a statistically significant variable (here, processor speed and RAM) from a model because of supposed multicollinearity. He is wrong.
  - This claim fails to recognize that multicollinearity is a “problem” only to the extent that it causes difficulty in estimating the coefficient(s) of interest with sufficient precision.<sup>11</sup> Here, there is no problem with precision; the processor speed, RAM, and LINPACK coefficients are estimated precisely—indeed, the coefficients on processor speed and RAM are statistically significantly different from zero.<sup>12</sup> Yet, Dr. Cockburn drops processor speed and RAM, apparently because he simply does not like the result he gets for the LINPACK coefficient when processor speed and RAM are included, and blames multicollinearity. But, dropping a variable is not a valid solution for multicollinearity, particularly when a statistical test rejects the dropping of the variable.<sup>13</sup> I also note that the Schwarz criterion supports the inclusion of processor speed and RAM.
  - Dr. Cockburn claims to have a “solution” to the multicollinearity problem that is “well-accepted.” I note that Dr. Cockburn fails to cite a single reference in the econometrics literature supporting his “solution.” In fact, his “solution” imposes a coefficient restriction that is strongly rejected by the data.<sup>14</sup> Thus, Dr. Cockburn’s “solution” is no solution at all, but instead a further misguided attempt on his part to force the results of his model to fit his preconceived notions, rather than let the data speak. (I also note that the “auxiliary regression” Dr. Cockburn ran, as

<sup>11</sup> See C. Achen, *Interpreting and Using Regression*, 1982, p. 82 (“The only effect of multicollinearity is to make it hard to get coefficient estimates with small standard error”); D. Gujarati, *Basic Econometrics*, 2003, p. 350 (“estimators have large variances and covariances, making precise estimation difficult”).

<sup>12</sup> Here, Dr. Cockburn errs by examining certain “indicators” of multicollinearity such as the variance inflation factor without actually looking at whether the supposed multicollinearity causes large standard errors. As Gujarati (2003), p. 363 states, “VIF (or tolerance) as a measure of collinearity is not free of criticism...high multicollinearity, as measured by a high VIF, may not necessarily cause high standard errors.”

<sup>13</sup> See Gujarati (2003), p. 365 (“it is clear that dropping a variable from the model to alleviate the problem of multicollinearity may lead to the specification bias. Hence the remedy may be worse than the disease in some situations because, whereas multicollinearity may prevent precise estimation of the parameters of a model, omitting a variable may seriously mislead us as to the true values of the parameters”).

<sup>14</sup> In discussing the imposition of “a priori” information to solve a multicollinearity problem, Gujarati (2003), p. 364 states, “a warning is in order here regarding imposing such a priori restrictions, ‘...since in general we will want to economic theory’s a priori predictions rather than simply impose them on data for which they may not be true’” (quoting M. Stewart and K. Wallis, *Introductory Econometrics*, 1981, p. 154). Here, Dr. Cockburn does not even base his restriction on economic theory. He has no basis a priori or otherwise for his restriction. In any event, it is strongly rejected by the data.

well as multicollinearity diagnostics, indicate that there is no problem with processor speed and thus Dr. Cockburn has no justification for dropping processor speed from his model in any event.)

- Dr. Cockburn supports his dropping of the processor speed variable from his model with a claim that consumers do not care about processor speed. However, Motorola (Droid Bionic) and Apple (iPhone 4S), for example, explicitly advertise to consumers regarding the processor used in their smartphones and its speed. In contrast, Dr. Cockburn provides no evidence that any consumer cared about the LINPACK score.
- Dr. Cockburn maintains that the eBay data is representative of the average smartphone purchaser. Dr. Cockburn claims that “arbitrage” ensures that the eBay outcomes are representative of other purchases of smartphones. This makes no sense given that the vast majority of smartphones are sold new, bundled with service, by a carrier, while eBay auctions are predominantly (over 80%) for used smartphones. “Arbitrage” between two markets is not possible where the two markets are selling largely different products targeted at different types of consumers.
- Dr. Cockburn claims that an Android-only model is not appropriate.
  - However, he completely ignores the results of the statistical test that I presented that demonstrates conclusively otherwise.<sup>15</sup>
  - Dr. Cockburn claims that I provided no motivation for not including other smartphones. There are at least two motivations. First, as discussed below, the data strongly reject Dr. Cockburn’s inclusion of the other smartphones. Dr. Cockburn should listen to what the data are telling him. Second, a fundamental principle of the modern theory of consumer demand is that there is variation across consumers in their preferences.<sup>16</sup> Consumers who prefer and purchase Android smartphones differ in their preferences from consumers who prefer and purchase iPhones. By including all consumers in one model, and assuming that the coefficients on the smartphone characteristics are the same for all consumers, Dr. Cockburn is at odds with the modern theory of consumer demand.
  - Dr. Cockburn says he included indicator variables to control for differences in smartphone platforms. However, since the data explicitly reject Dr. Cockburn’s model because of differences in smartphone platforms, the data are demonstrating that the indicator variables do not do a sufficiently good job capturing these differences. Dr. Cockburn is choosing to ignore what the data are telling him.

<sup>15</sup> This particular test has a long history in economics. See, e.g., G. Chow, “Tests of Equality Between Sets of Coefficients in Two Linear Regressions,” *Econometrica*, 1960.

<sup>16</sup> See, e.g., S. Berry, J. Levinsohn, and A. Pakes, “Automobile Prices in Market Equilibrium,” *Econometrica*, 1995.

- Dr. Cockburn's claim that you should change the model specification when you subset the data makes no sense as a matter of econometrics. An assumption of Dr. Cockburn's model is that the model applies to each observation in the data. Thus, one should get approximately the same results running his model on any subset of the data, as long as the subset is chosen on the basis of an exogenous variable. Instead, in this case, Dr. Cockburn's model gives different answers for different subsets. This means that Dr. Cockburn's assumption—that the same model applies to all observations—is wrong.<sup>17</sup> Indeed, if Dr. Cockburn has to change the specification when he subsets the data, that itself is an indication that his model is incorrectly specified.
- Dr. Cockburn claims that his own model, when run just on the Android subset, gives “perverse results.” Again, it should be noted that this is his own model that he complains about. By combining the Android subset with the data for the other smartphone platforms, Dr. Cockburn is simply hiding the “perverse results” for the Android subset by mixing it in with the (apparently) less perverse results for other platforms. By running the Android subset separately, I have uncovered what Dr. Cockburn has attempted to hide—that his model does not work for the Android subset. (I also note that in Dr. Cockburn's original model, there are also “perverse results” such as a negative coefficient on data tethering.)
- Dr. Cockburn goes on to try to drop variables from his model when run just on the Android subset. However, a statistical test yet again rejects Dr. Cockburn's improper dropping of variables. According to the data, those variables should be included in the model. In addition, a widely-used measure of model fit, called the Schwarz criterion, is superior for the model with all the variables than for the model where Dr. Cockburn drops variables. (I note that Dr. Cockburn got the wrong answer here because he made yet another computational error in his analysis. He mistakenly included single bidder auctions when he was running his model. In addition, he compares the Schwarz criterion from my results to the Schwarz criterion from his result, even though the two sets of results are based on different data sets. Comparisons between two models using the Schwarz criterion must be done only when the two models have been estimated on the exact same data.) Thus, Dr. Cockburn has no basis in econometrics to drop variables from the model run on the Android subset.
- Dr. Cockburn claims that his time on market variable controls for obsolescence. If this were true, the variables I added as additional controls for obsolescence would not have been statistically significant. Again, Dr. Cockburn ignores the results of objective, scientific statistical tests.

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<sup>17</sup> See Chow (1960).



- Dr. Cockburn has no answer to his model's failure of the Hausman specification test, one of the most widely used econometric reliability tests, except that the test is based on coefficients other than the LINPACK coefficient.<sup>18</sup> However, bias is transmitted from one estimated coefficient to another (except under unusual circumstances that Dr. Cockburn has not shown are present here). Thus, if there is bias in one coefficient, the other coefficients are biased as well.
- In his model that allows separate coefficients on LINPACK by month, he incorrectly imposes the restriction on the other coefficients that they be equal across all months. There is no economic basis for this restriction and in fact it is rejected by the data. Again, Dr. Cockburn ignores the results of statistical testing.
- Dr. Cockburn apparently does not understand the purpose of looking at the results of the model applied only to people who bid on a single Android auction. The purpose is simple. Dr. Cockburn is using his analysis to predict what Android purchasers would have done in his but-for world. Given that, it makes no economic sense to study consumers other than Android consumers. For example, the preferences of iPhone consumers are irrelevant for what Android consumers would have done. Indeed, mixing iPhone consumers in with Android consumers creates biases, as the statistical tests I have performed demonstrate. Dr. Cockburn's analysis at best indicates what a hybrid iPhone-RIM-Windows-Android consumer would have done. However, no such consumer exists, and indeed such a consumer, even if it did exist, would not be a good predictor of what an Android consumer would do.



Gregory K. Leonard

Dated: February 17, 2012

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<sup>18</sup> J. Hausman, "Specification Tests in Econometrics," *Econometrica*, 1982.



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Dr. Leonard is a Senior Vice President in NERA's Antitrust and Intellectual Property Practices. His areas of expertise are applied microeconomics and econometrics. He has extensive experience analyzing competition and estimating damages in a wide variety of contexts. Dr. Leonard has provided written and oral testimony and presentations before federal and state courts, government agencies, and arbitration panels on issues involving antitrust, damages estimation, statistics and econometrics, surveys, valuation, and labor market discrimination.

Prior to joining NERA, Dr. Leonard was a Senior Vice President at Lexecon Inc., a founding member and Director of Cambridge Economics, Inc., and an Assistant Professor at Columbia University, where he taught statistics, econometrics, and labor economics.

Dr. Leonard has experience in a broad range of industries, including pharmaceuticals, telecommunications, airlines, semiconductors, hedge funds, securities, commercial and recreational fishing, medical devices, professional sports, credit card networks, payment systems, information services, computer software, computer hardware, chemicals, plastics, flat glass, retailing, advertising, beef processing, fertilizers, printing, petroleum, steel, beer, cereals, cosmetics, athletic apparel, film, milk, canned fish, vitamins, animal feed supplements, tissue, paperboard, industrial gas, concrete, automobiles, contact lens cleaners, sports beverages, soft drinks, diapers, tobacco products, graphite and carbon products, and modems, among others.

Dr. Leonard has published widely on the issues of antitrust, industrial organization, labor economics, and econometrics. His publications have appeared in the *RAND Journal of Economics*, the *Journal of Industrial Economics*, the *Journal of Econometrics*, the *International Journal of Industrial Organization*, the *Journal of Public Economics*, *Annales Economie et de Statistique*, the *Journal of Labor Economics*, the *International Journal of the Economics of Business*, *Antitrust Law Journal*, *Antitrust*, *Antitrust Source*, the *Journal of Economic Analysis & Policy*, *Journal of Competition Law and Economics*, the *Journal of Economic Surveys*, 法学家 (*Jurists' Review*), *Antitrust Chronicle*, the *Berkeley Technology Law Journal*, the *Columbia Science and Technology Law Review*, the *European Competition Law Review*, *les Nouvelles*, *Landslide*, *Managing Intellectual Property*, *Legal Issues of Economic Integration*, and the *George Mason Law Review*. Dr. Leonard co-authored two chapters in the American Bar Association Section of Antitrust Law (ABA) volume *Issues in Competition Law and Policy*, co-authored the "Econometrics and Regression Analysis" chapter of the ABA volume *Proving Antitrust Damages*, and was a contributor to the ABA volume *Econometrics*. He co-edited *Economic Approaches to Intellectual Property: Policy, Litigation, and Management* and authored or co-authored three of its chapters. One of these chapters (co-authored with Lauren J. Stiroh) was cited by the Court of Appeals for the Federal Circuit in its *Uniloc* decision. Dr.

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Leonard is an Associate Editor of the *Antitrust Law Journal* and a co-editor of the ABA Section of Antitrust Law Economics Committee newsletter, and has served as a referee for numerous economics journals.

Dr. Leonard was invited to speak on merger simulation at the 2004 US Department of Justice and Federal Trade Commission (FTC) Merger Workshop, the econometrics of evaluating competition in local retail markets at the 2008 FTC Retail Mergers Workshop, and the calculation of patent damages at the 2009 Hearings on the Evolving IP Marketplace. The 2011 FTC report resulting from the latter hearings cited Dr. Leonard extensively. In 2005, Dr. Leonard served as a consultant on the issue of immunities and exemptions to the Antitrust Modernization Commission (AMC), which was tasked by Congress and the President with developing recommendations for changes to the US antitrust laws. He testified before the AMC in December 2005.

Dr. Leonard has extensive experience with international antitrust and intellectual property issues, particularly in Asia. He has given invited presentations at the Anti-Monopoly Bureau of China's Ministry of Commerce (MOFCOM), the Supreme People's Court of China, Renmin University, the Chinese Academy of Social Sciences, and the University of Political Science and Law. He was a member of ABA and US Chamber of Commerce delegations to joint workshops with the Chinese antitrust agencies, MOFCOM, NDRC, and SAIC, and served on the working groups of the ABA's Sections of Antitrust Law and International Law that prepared comments on MOFCOM's and SAIC's draft regulations. Dr. Leonard has also given presentations to the Japan Fair Trade Commission and the India Competition Commission.

Dr. Leonard received an ScB in Applied Mathematics-Economics from Brown University and a PhD in Economics from the Massachusetts Institute of Technology, where he was a National Science Foundation Graduate Fellow and an Alfred P. Sloan Foundation Fellow.

## Education

### **Massachusetts Institute of Technology**

PhD, Economics, 1989

Alfred P. Sloan Foundation Fellowship, 1988-1989

National Science Foundation Graduate Fellowship, 1985-1988

### **Brown University**

ScB, Applied Mathematics-Economics, 1985

Rohn Truell Memorial Premium in Applied Mathematics, 1985

## Professional Experience

### **NERA Economic Consulting**

2008- Senior Vice President

2004-2008 Vice President

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1990-1991 Senior Analyst

**Lexecon Inc.**  
2000-2004 Senior Vice President

**Cambridge Economics, Inc.**  
1991-2000 Director

**Columbia University**  
1989-1990 Assistant Professor  
Teaching Areas: Econometrics, Statistics, Labor Economics

## Papers and Publications

“A Proposed Method for Measuring Competition Among Imperfect Substitutes,” *Antitrust Law Journal* 60, 1992, pp. 889-900 (with J. Hausman and D. Zona).

“Issues in the Contingent Valuation of Environmental Goods: Methodologies for Data Collection and Analysis,” in *Contingent Valuation: A Critical Assessment*, Ed. by J. A. Hausman, North Holland Press, 1993 (with D. McFadden).

“Assessing Use Value Losses Due to Natural Resource Injury,” in *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993 (with J. Hausman and D. McFadden).

“Does Contingent Valuation Measure Preferences? Experimental Evidence,” in *Contingent Valuation: A Critical Assessment*, ed. by J. A. Hausman, North Holland Press, 1993 (with P. Diamond, J. Hausman, and M. Denning).

“Competitive Analysis with Differentiated Products,” *Annales d'Economie et de Statistique* 34, 1994, pp. 159-180 (with J. Hausman and D. Zona).

“A Utility Consistent, Combined Discrete Choice and Count Data Model: Assessing Recreational Use Losses Due to Natural Resource Damage,” *Journal of Public Economics* 56, 1995, pp. 1-30 (with J. Hausman and D. McFadden).

“Market Definition Under Price Discrimination,” *Antitrust Law Journal* 64, 1996, pp. 367-386 (with J. Hausman and C. Velluro).

“Achieving Competition: Antitrust Policy and Consumer Welfare,” *World Economic Affairs* 1, 1997, pp. 34-38 (with J. Hausman).

“Economic Analysis of Differentiated Products Mergers Using Real World Data,” *George Mason Law Review* 5, 1997, pp. 321-346 (with J. Hausman).

Gregory K. Leonard

“Superstars in the NBA: Economic Value and Policy,” *Journal of Labor Economics* 15, 1997, pp. 586-624 (with J. Hausman).

“Efficiencies From the Consumer Viewpoint,” *George Mason Law Review* 7, 1999, pp. 707-727 (with J. Hausman).

“Documents Versus Econometrics in Staples,” contributed to [www.antitrust.org](http://www.antitrust.org), also available at [www.nera.com](http://www.nera.com) (with J. Hausman).

“The Competitive Effects of a New Product Introduction: A Case Study,” *Journal of Industrial Economics* 30, 2002, pp. 237-263 (with J. Hausman).

“Does Bell Company Entry into Long-Distance Telecommunications Benefit Consumers?” *Antitrust Law Journal* 70, 2002, pp. 463-484 (with J. Hausman and J. G. Sidak).

“On Nonexclusive Membership in Competing Joint Ventures,” *RAND Journal of Economics* 34, 2003 (with J. Hausman and J. Tirole).

“Correcting the Bias When Damage Periods are Chosen to Coincide With Price Declines,” *Columbia Business Law Review*, 2004, pp. 304-306 (with D. Carlton).

“Competitive Analysis Using a Flexible Demand Specification,” *Journal of Competition Law and Economics* 1, 2005, pp. 279-301 (with J. Hausman).

“Using Merger Simulation Models: Testing the Underlying Assumptions,” *International Journal of Industrial Organization* 23, 2005, pp. 693-698 (with J. Hausman).

“Application of Empirical Methods in Merger Analysis,” report to the Fair Trade Commission of Japan, June 27, 2005 (with C. Dippon and L. Wu).

“A Practical Guide to Damages,” in *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005 (with L. Stiroh).

“Applying Merger Simulation Techniques to Estimate Lost Profits Damages in Intellectual Property Litigation,” in *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005.

“Antitrust Implications of Pharmaceutical Patent Litigation Settlements,” in *Economic Approaches to Intellectual Property, Policy, Litigation and Management*, ed. by G. Leonard and L. Stiroh, 2005 (with R. Mortimer).

“Framework for Policymakers to Analyze Proposed and Existing Antitrust Immunities and Exemptions,” report to the Antitrust Modernization Commission, October 24, 2005 (with D. Bush and S. Ross).

Gregory K. Leonard

“Real Options and Patent Damages: The Legal Treatment of Non-Infringing Alternatives and Incentives to Innovate,” *Journal of Economic Surveys* 20, 2006, pp. 493-512 (reprinted in *Economic and Legal Issues in Intellectual Property*, M. McAleer and L. Oxley, eds., Blackwell Publishing, 2007) (with J. Hausman).

“The Competitive Effects of Bundled Discounts,” in *Economics of Antitrust: Complex Issues in a Dynamic Economy*, ed. by L. Wu, 2007.

“Estimation of Patent Licensing Value Using a Flexible Demand Specification,” *Journal of Econometrics* 139, 2007, pp. 242-258 (with J. Hausman).

“Patent Damages and Real Options: How Judicial Characterization of Non-Infringing Alternatives Reduces Incentives to Innovate,” *Berkeley Technology Law Journal* 22, Spring 2007, pp. 825-853 (with J. Hausman and J. G. Sidak).

“Don’t Feed the Trolls,” *les Nouvelles*, Vol. 42, September 2007, pp. 487-495 (reprinted in *Patent Trolls: Legal Implications*, C.S. Krishna, ed., The Icfai University Press, 2008) (with J. Johnson, C. Meyer, and K. Serwin).

“Are Three to Two Mergers in Markets with Entry Barriers Necessarily Problematic?” *European Competition Law Review* 28, October 2007, pp. 539-552 (with N. Attenborough and F. Jimenez).

“Economics and the Rigorous Analysis of Class Certification in Antitrust Cases,” *Journal of Competition Law and Economics* 3, 2007, pp. 341-356 (with J. Johnson).

“Assessing the Competitive Effects of a Merger: Empirical Analysis of Price Differences Across Markets and Natural Experiments,” *Antitrust*, Fall 2007, pp. 96-101 (with L. Wu).

“Incentives and China’s New Antimonopoly Law,” *Antitrust*, Spring 2008, pp. 73-77 (with F. Deng).

“Use of Simulation in Competitive Analysis,” in *Issues in Competition Law and Policy*, ed. by W. Dale Collins, 2008 (with J.D. Zona).

“Allocative and Productive Efficiency,” in *Issues in Competition Law and Policy*, ed. by W. Dale Collins, 2008 (with F. Deng).

“In the Eye of the Beholder: Price Structure as Junk Science in Antitrust Class Certification Proceedings,” *Antitrust*, Summer 2008, pp. 108-112 (with J. Johnson).

“Merger Retrospective Studies: A Review,” *Antitrust*, Fall 2008, pp. 34-41 (with G. Hunter and G. S. Olley).

“Roundtable Discussion: Developments—and Divergence—In Merger Enforcement,” *Antitrust*, Fall 2008, pp. 9-27.

“Dispatch From China,” *Antitrust*, Spring 2009, pp. 88-89.

“A Hard Landing in the Soft Drink Market – MOFCOM’s Veto of the Coca-Cola/Huiyuan Deal,” *Antitrust Chronicle*, April 2009(2) (with F. Deng and A. Emch).

“Predatory Pricing after *linkline* and *Wanadoo*,” *Antitrust Chronicle*, May 2009(2) (with A. Emch).

“Farrell and Shapiro: The Sequel,” *Antitrust*, Summer 2009, pp. 14-18 (with M. Lopez).

“掠夺性定价—美国与欧盟的法律及经济学分析” (“Predatory Pricing - Economics and Law in the United States and the European Union”), *法学家 (Jurists’ Review)*, 2009, pp. 100-110 (with A. Emch).

“Revising the Merger Guidelines: Second Request Screens and the Agencies’ Empirical Approach to Competitive Effects,” *Antitrust Chronicle*, December 2009(1) (with L. Wu).

“How Private Antitrust Litigation May Be Conducted in China,” *Competition Law360*, January 6, 2010 (with F. Deng and W. Tang).

“Merger Screens: Market-Share Based Approaches and ‘Upward Pricing Pressure,’” *Antitrust Source*, February 2010 (with E. Bailey, G. S. Olley, and L. Wu).

“Minimum Resale Price Maintenance: Some Empirical Evidence From Maryland,” *BE Journal of Economic Analysis & Policy* 10, 2010 (with E. Bailey).

“Three Cases Reshaping Patent Licensing Practice,” *Managing Intellectual Property*, March 2010 (with E. Bailey and A. Cox).

“Econometrics and Regression Analysis,” in *Proving Antitrust Damages: Legal and Economic Issues*, ABA Section of Antitrust (2<sup>nd</sup> Edition), 2010 (with J. Langenfeld, W. Li, and J. Morris).

“Patent Damages: What Reforms Are Still Needed?,” *Landslide* 2, May/June 2010 (with M. Lopez).

“The Google Books Settlement: Copyright, Rule 23, and DOJ Section 2 Enforcement,” *Antitrust*, Summer 2010, pp. 26-31.

“The 2010 Merger Guidelines: Do We Need Them? Are They All We Need?,” *Antitrust Chronicle*, October 2010(2).

“Evaluating the Unilateral Competitive Effects of Mergers Among Firms with High Profit Margins,” *Antitrust*, Fall 2010, pp. 28-32 (with E. Bailey and L. Wu).

“Predatory Pricing in China—In Line With International Practice?,” *Legal Issues of Economic Integration* 37, 2010, pp. 305-316 (with A. Emch).



Gregory K. Leonard

“What Can Be Learned About the Competitive Effects of Mergers From ‘Natural Experiments’?,” *International Journal of the Economics of Business* 18, 2011, pp. 103-107 (with G. S. Olley).

“District Court Rejects the Google Books Settlement: A Missed Opportunity?,” *Antitrust Source*, April 2011.

“Making Sense of ‘Apportionment’ in Patent Damages,” *Columbia Science and Technology Law Review* 12, pp. 255-271, 2011 (with E. Bailey and M. Lopez).

“Rigorous Analysis of Class Certification Comes of Age,” *Antitrust Law Journal* 77, 2011, pp. 569-586 (with J. Johnson).

“Economic Analysis in Indirect Purchaser Class Actions,” *Antitrust*, Fall 2011, pp. 51-57 (with F. Deng and J. Johnson).

“A Comparison of the Almost Ideal Demand System and Random Coefficients Logit Models For Use with Retail Scanner Data,” NERA Working Paper, 2007 (with F. Deng).

## **Presentations**

“Merger Analysis with Differentiated Products,” paper presented to the Economic Analysis Group of the US Department of Justice, April 1991 (with J. Hausman and D. Zona).

“Assessing Use Value Losses Due to Natural Resource Injury,” paper presented at “Contingent Valuation: A Critical Assessment,” Cambridge Economics Symposium, April 3, 1992 (with J. Hausman and D. McFadden).

“Contingent Valuation and the Value of Marketed Commodities,” paper submitted to the Contingent Valuation Panel of the National Oceanic and Atmospheric Administration, U.S. Department of Commerce, August 12, 1992 (with J. Hausman).

“Economic Analysis of Differentiated Products Mergers Using Real World Data,” paper presented to the George Mason University Law Review Antitrust Symposium, October 11, 1996 (with J. Hausman).

“Documents Versus Econometrics in Staples,” paper presented to a program of the Economics Committee of the ABA Antitrust Section, September 5, 1997 (with J. Hausman).

Discussant, “New Developments in Antitrust” session, AEA meetings, January 7, 2000.

“In Defense of Merger Simulation,” Department of Justice and Federal Trade Commission Merger Workshop, Unilateral Effects Session, February 18, 2004.

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Discussant, “Proving Damages in Difficult Cases: Mock Trial & Discussion,” NERA Antitrust & Trade Regulation Seminar, July 10, 2004.

“Network Effects, First Mover Advantage, and Merger Simulation in Damages Estimation,” LSI Workshop on Calculating and Proving Patent Damages, July 16, 2004.

“Early Exchange of Documents,” LSI Workshop on Pre- and Early Stage Patent Litigation, July 23, 2004.

“Lessons Learned From Problems With Expert Testimony: Antitrust Suits,” LSI Workshop on Effective Financial Expert Testimony, November 4, 2004.

“Price Erosion and Convoyed Sales,” LSI Workshop on Calculating & Proving Patent Damages, January 19, 2005.

“Economic Analysis of Rule 23(b)(3),” LSI Litigating Class Action Suits Conference, June 6, 2005.

“Early Exchange of Documents,” LSI Workshop on Pre- & Early-Stage Patent Litigation, July 22, 2005.

“Issues to Consider in a Lost Profits Damages Analysis,” Patent Litigation 2005, Practicing Law Institute, September 30, 2005.

“Antitrust Issues in Standard Setting and Patent Pools,” Advanced Software Law and Practice Conference, November 3, 2005.

“New Technologies for Calculating Lost Profits,” LSI Workshop on Calculating & Proving Patent Damages, February 27, 2006.

“Estimating Antitrust Damages,” Fair Trade Commission of Japan, April 21, 2006.

“Economic Analysis of Rule 23(b)(3),” LSI Litigating Class Action Suits Conference, May 11, 2006.

“Permanent Injunction or Damages: What is the Right Remedy for Non-Producing Entities?,” San Francisco Intellectual Property Law Association/Los Angeles Intellectual Property Law Association Spring Seminar, May 20, 2006.

“Antitrust Enforcement in the United States” and “Economic Analysis of Mergers,” Sino-American Symposium on the Legislation and Practice of Anti-Trust Law, Beijing Bar Association, Beijing, People’s Republic of China, July 17, 2006.

“Economic Analysis in Antitrust,” Chinese Academy of Social Sciences, Beijing, People’s Republic of China, July 20, 2006.



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“Issues to Consider in a Lost Profits Damages Analysis,” Patent Litigation 2006, Practicing Law Institute, September 26, 2006.

“Comparison of the Almost Ideal Demand System and Random Coefficient Models for Use With Retail Scanner Data,” Pacific Rim Conference, Western Economic Association, Beijing, People’s Republic of China, January 12, 2007 (with F. Deng).

Discussant, “Applied Economics” Session, Pacific Rim Conference, Western Economic Association, Beijing, People’s Republic of China, January 12, 2007.

“Balancing IPR Protection and Economic Growth in China,” International Conference on Globalization and the Protection of Intellectual Property Rights, Chinese University of Political Science and Law, Beijing, People’s Republic of China, January 20, 2007.

“The Use and Abuse of Daubert Motions on Damages Experts: Lessons from Recent Cases,” LSI Workshop on Calculating & Proving Patent Damages, February 27, 2007.

“Will Your Licenses Ever be the Same? Biotechnology IP Strategies,” BayBio 2007 Conference, April 26, 2007.

“Tension Between Antitrust Law and IP Rights,” Seminar on WTO Rules and China’s Antimonopoly Legislation, Beijing, People’s Republic of China, September 1, 2007.

“Issues to Consider in a Lost Profits Damages Analysis,” Patent Litigation 2007, Practicing Law Institute, September 25, 2007.

Discussant, “Dominance and Abuse of Monopoly Power” Session, China’s Competition Policy and Anti-Monopoly Law, J. Mirrlees Institute of Economic Policy Research, Beijing University, and the Research Center for Regulation and Competition, Chinese Academy of Social Sciences, Beijing, People’s Republic of China, October 14, 2007.

“Opening Remarks,” Seminar on China’s Anti-monopoly Law and Regulation on Abuse of Intellectual Property Rights, Beijing, People’s Republic of China, April 26, 2008.

“Issues to Consider in a Reasonable Royalty Damages Analysis,” Patent Litigation 2008, Practicing Law Institute, October 7, 2008.

“Econometric Evaluation of Competition in Local Retail Markets,” Federal Trade Commission and National Association of Attorneys General Retail Mergers Workshop, December 2, 2008

“Merger Review Best Practices: Competitive Effects Analysis,” International Seminar on Anti-Monopoly Law: Procedure and Substantive Assessment in Merger Control, Beijing, People’s Republic of China, December 15-17, 2008.

“The Use of Natural Experiments in Antitrust,” Renmin University, Beijing, People’s Republic of China, December 18, 2008.

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“China’s Antimonopoly Law: An Economist’s Perspective,” Bloomberg Anti-Monopoly Law of China Seminar, January 29, 2009.

Panelist, “Standards for Assessing Patent Damages and Their Implementation by Courts,” FTC Hearings on the Evolving IP Marketplace, February 11, 2009.

“Economic Analysis of Agreements Between Competitors” and “Case Study: FTC Investigates Staples’ Proposed Acquisition of Office Depot,” Presentation to Delegation of Antitrust Officials from the People’s Republic of China, Washington, DC, March 23, 2009.

“Reasonable Royalties in the Presence of Standards and Patent Pools,” LSI Workshop, April 20, 2009.

Presentations on Unilateral Effects, Buyer Power, and the Intellectual Property-Antitrust Interface to Delegation from the Anti-Monopoly Bureau of MOFCOM of the People’s Republic of China, Washington, DC, May 10-11, 2009.

Panelist, “The Use of Economic and Statistical Models in Civil and Criminal Litigation,” Federal Bar Association, San Francisco, May 13, 2009.

“Trends in IP Rights Litigation and Economic Damages in China,” Pursuing IP in the Pacific Rim, May 14, 2009.

Presentation on the Economics of Antitrust, National Judicial College of the People’s Republic of China, Xi’an, People’s Republic of China, May 25-26, 2009.

“Case Study: The Use of Economic Analysis in Merger Review,” Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People’s Republic of China, May 27, 2009.

“Economics and Antitrust Law,” China University of Political Science and Law, Beijing, People’s Republic of China, September 21, 2009.

“Case Study: Economic Analysis of Coordinated Interaction,” Presentation to the Anti-Monopoly Bureau of MOFCOM, Beijing, People’s Republic of China, September 22, 2009.

“Relevant Market Definition,” 4<sup>th</sup> Duxes Antitrust Law Seminar, Beijing, People’s Republic of China, September 26, 2009.

“Expert Economic Testimony in Antitrust Litigation,” Supreme People’s Court, Beijing, People’s Republic of China, February 2, 2010.

“New Case Law for Patent Damages,” Law Seminars International Telebriefing, April 28, 2010.

“China/India: Sailing in Uncharted Waters: Regulating Competition in the Emerging Economies – New Laws, New Enforcement Regimes and No Precedents,” The Chicago Forum

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on International Antitrust Issues, Northwestern University School of Law Searle Center, May 20, 2010.

“Antitrust and Intellectual Property,” Supreme People’s Court, Beijing, People’s Republic of China, May 26, 2010.

“Cartel Enforcement Trends in the United States,” 2<sup>nd</sup> Ethical Beacon Anti-Monopoly Summit, Beijing, People’s Republic of China, May 27, 2010.

Panelist, “The Future of Books and Digital Publishing: the Google Book Settlement and Beyond,” 2010 American Bar Association Annual Meeting, August 7, 2010.

“Coordinated Effects” and “Non-Horizontal Mergers,” Presentations to Delegation from India Competition Commission, US Chamber of Commerce, Washington, DC, October 26, 2010.

“UPP and Merger Simulation,” Annual Conference of the Association of Competition Economics, Norwich, UK, November 11, 2010.

“Uniloc v. Microsoft: A Key Ruling For Patent Damages,” Law Seminars International Telebriefing, January 21, 2011.

“Correlation, Regression, and Common Proof of Impact,” New York City Bar Association, January 19, 2011.

“Private Litigation Under China’s New Antimonopoly Law,” Bar Association of San Francisco, February 17, 2011.

“Competition Law and State Regulation: Setting the Stage and Focus on State-Owned Enterprises,” Competition Law and the State: International and Comparative Perspectives, Hong Kong, People’s Republic of China, March 18, 2011.

Panelist, “Booking it in Cyberspace: The Google Book Settlement and the Aftermath,” American Intellectual Property Law Association, San Francisco, May 13, 2011.

“Econometric Estimation of Cartel Overcharges,” ZEW Conference on Economic Methods and Tools in Competition Law Enforcement, Mannheim, Germany, June 25, 2011.

Panelist, “Antitrust and IP in China,” Antitrust and IP in Silicon Valley and Beyond, American Bar Association and Stanford University, Palo Alto, October 6, 2011.

## **Professional Activities**

Member, American Economic Association

Member, Econometric Society

Gregory K. Leonard

Member, American Bar Association

Contributor, [www.antitrust.org](http://www.antitrust.org)

Contributor, ABA Section of Antitrust Law, *Econometrics*, 2005

Associate Editor, *Antitrust*, 2007-2010

Associate Editor, *Antitrust Law Journal*, 2010-

Co-Editor, ABA Section of Antitrust Law Economics Committee Newsletter,  
2009-

Member, Economics Task Force, ABA Section of Antitrust Law, 2011-

Member, ABA Delegation to International Seminar on Anti-Monopoly Law:  
Procedure and Substantive Assessment in Merger Control, Beijing,  
People's Republic of China, December 15-17, 2008

Member, Working Group for drafting the "Joint Comments of the American Bar  
Association Section of Antitrust Law and Section of International Law on  
the MOFCOM Draft Guidelines for Definition of Relevant Markets," 2009

Member, Working Group for drafting the "Joint Comments of the American Bar  
Association Section of Antitrust Law and Section of International Law on  
the SAIC Draft Regulations on the Prohibition of Acts of Monopoly  
Agreements and of Abuse of Dominant Market Position," 2009.

Member, Working Group for drafting the "Joint Comments of the American Bar  
Association Section of Antitrust Law and Section of International Law on  
the SAIC Draft Regulations on the Prohibition of Acts of Monopoly  
Agreements and of Abuse of Dominant Market Position," 2010.

Referee: *Econometrica*, *Review of Economics and Statistics*, *International  
Journal of Industrial Organization*, *Review of Industrial Organization*,  
*Journal of Sports Economics*, *Journal of Environmental Economics and  
Management*, *Research in Law and Economics*, *Labour Economics*,  
*Eastern Economic Journal*, *Journal of Forensic Economics*, *Antitrust*,  
*Antitrust Law Journal*, *Journal of Competition Law and Economics*

## Depositions, Reports, and Testimony

*Mark Abdu-Brisson, et al. v. Delta Air Lines and ALPA*, US District Court for the Southern  
District of New York, 1996 (Report, Deposition).

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*Polar Air Cargo v. AFL Air Cargo*, US District Court for the Southern District of New York, 1998 (Report).

*Maxson Automatic Machinery Company, et al. v. the Washington Trust Company*, Superior Court of the State of Rhode Island, 2000 (Affidavit).

*MCI Telecommunications Corporation, et al. v. U S WEST Communications, Inc.*, before the Federal Communications Commission, File No. E-96-25, 2000 (Affidavit).

*Sprint Communications Company L.P. v. U S WEST Communications, Inc.*, before the Federal Communications Commission, File No. E-95-42, 2000 (Affidavit).

*AT&T v. U S WEST Communications, Inc.*, Arbitration, 2000 (Report).

*RDV Sports, Inc. v. Logo Connections, Inc.*, US District Court for the Middle District of Florida, Orlando Division, Civil Action No. 99-1346-CV-31B, 2000 (Report).

*AT&T v. U S WEST Communications, Inc.*, before the Federal Communications Commission, File No. E-97-28, 2001 (Affidavit).

*MCI Telecommunications Corporation v. U S WEST Communications, Inc.*, before the Federal Communications Commission, File No. E-97-40, 2001 (Affidavit).

*AT&T v. U S WEST Communications, Inc.*, Arbitration, 2002 (Report, Deposition, Hearing Testimony).

*Louie Alakayak, et al. v. All Alaskan Seafoods, et al.*, Superior Court of the State of Alaska, 1998, 2003 (Report, Deposition, Trial Testimony).

*Core Communications, Inc. v. Verizon Maryland, Inc.*, before the Federal Communications Commission, File No. EB-01-MD-007, 2003 (Declaration).

*Davol, Inc. v. Stryker Corporation*, United States District Court for the District of Rhode Island, Civil Action No. 01-388T, 2003-2004 (Report, Supplemental Report, Second Supplemental Report, Third Supplemental Report, Deposition).

*CSC Holdings, Inc. v. Yankees Entertainment and Sports Network, LLC*, American Arbitration Association, Case No. 13 181 02839 03, 2004 (Report, Hearing Testimony).

*Viacom, Inc., et al. v. Donald F. Flynn, et al.*, Circuit Court of Cook County, Illinois, No. 97 CH 3015, 2004 (Report, Deposition).

Hearing Before the Antitrust Modernization Commission, December 1, 2005 (Statutory Immunities and Exemptions).

*Joseph V. Kapusta v. Gale Corporation*, United States District Court for the Eastern District of California, Case No. CIV-S-03-1232 LKK KJM, 2006 (Report).

Gregory K. Leonard

*Central Valley Chrysler Jeep, Inc. et al. v. Witherspoon*, United States District Court for the Eastern District of California, Case No. CIV-F-04-6663 REC LJO, 2006-2007 (Report, Deposition).

*Bard Peripheral Vascular, Inc. and David Goldfarb, M.D. v. W.L. Gore & Associates, Inc.*, United States District Court for the District of Arizona, Case No. CIV-03-0597-PHX-MHM, 2006-2009 (Report, Reply Report, Deposition, Trial Testimony, Declarations, Report on Supplemental Damages, Deposition on Supplemental Damages; Report on Compulsory License, Deposition on Compulsory License).

*In re: BULK [EXTRUDED] GRAPHITE PRODUCTS ANTITRUST LITIGATION*, United States District Court for the District of New Jersey, Master File No. 02-CV-06030 (WHW), 2006-2007 (Report, Deposition).

*Abbott Laboratories, et al. v. Impax Laboratories, Inc.*, United States District Court for the District of Delaware, C.A. No. 03-120-KAJ, 2006-2008 (Report, Rebuttal Report, Deposition).

*Novo Nordisk A/S v. Aventis Pharmaceuticals Inc., Sanofi-Aventis and Aventis Pharma Deutschland GMBH*, United States District Court for the District of Delaware, C.A. 05-645-SLR, 2007 (Report, Deposition).

*In the Matter of CERTAIN SEMICONDUCTOR CHIPS WITH MINIMIZED CHIP PACKAGE SIZE AND PRODUCTS CONTAINING SAME*, before the United States International Trade Commission, Inv. No. 337-TA-605, 2008 (Report, Supplemental Report, Deposition, Trial Testimony).

*In the Matter of CERTAIN BASEBAND PROCESSOR CHIPS AND CHIPSETS, TRANSMITTER AND RECEIVER (RADIO) CHIPS, POWER CONTROL CHIPS, AND PRODUCTS CONTAINING SAME, INCLUDING CELLULAR TELEPHONE HANDSETS*, before the United States International Trade Commission, Inv. No. 337-TA-543, 2008 (Report, Rebuttal Report, Deposition, Trial Testimony).

*Convolve, Inc. and Massachusetts Institute of Technology v. Compaq Computer Corp. and Seagate Technology, LLC*, United States District Court for the Southern District of New York, Index No. 00 Civ. 5141 (JSM), 2008 (Report, Deposition).

*In re Static Random Access Memory (SRAM) Antitrust Litigation*, United States District Court for the Northern District of California, Case No. M:07-cv-1819 CW, 2008 (Report, Deposition).

*Venetec International, Inc. v. Nexus Medical, LLC*, United States District Court for the District of Delaware, C.A. No. 07-57 (MPT), 2008 (Report, Deposition, Supplemental Report, Second Supplemental Report).

*John W. Brantigan v. DePuy Spine, Inc.*, United States District Court for the Western District of Washington at Seattle, No. C08-0177 RSL, 2009 (Report, Deposition).



Gregory K. Leonard

*Agilent Technologies, Inc. v. Joseph J. Kirkland, et al.*, Court of Chancery of the State of Delaware, C.A. No. 3512-VCS, 2009 (Report, Deposition, Supplemental Report, Trial Testimony).

*Greenberg Traurig v. Gale Corporation*, United States District Court for the Eastern District of California, No. 2:07-CV-01572 MCE DAD, 2009 (Report).

*In the Matter of CERTAIN SEMICONDUCTOR INTEGRATED CIRCUITS USING TUNGSTEN METALIZATION AND PRODUCTS CONTAINING SAME*, before the United States International Trade Commission, Inv. No. 337-TA-648, 2009 (Report, Deposition, Trial Testimony).

*Edwards Lifesciences AG and Edwards Lifesciences, LLC v. CoreValve, Inc.*, United States District Court for the District of Delaware, C.A. No. 08-091 (GMS), 2009-2011 (Report, Deposition, Updated Report, Trial Testimony, Declarations).

*WiAV Solutions, LLC v. Motorola, Inc., et al.*, United States District Court, Eastern District of Virginia, Richmond Division, Civil Action No. 3:09-cv-447-REP, 2010 (Report, Deposition).

*In the Matter of CERTAIN NOTEBOOK COMPUTER PRODUCTS AND COMPONENTS THEREOF*, before the United States International Trade Commission, Inv. No. 337-TA-705, 2010 (Report, Deposition).

*Technology Patents, LLC v. Deutsche Telekom AG, et al.*, United States District Court, District of Maryland, Civil Action No. 8:07-cv-03012-AW, 2010 (Report).

*Hollister Incorporated. v. C.R. Bard, Inc.*, United States District Court, Northern District of Illinois, Eastern Division, Civil Case No. 10-6427, 2011 (Declaration, Deposition).

*Quercus Trust v. LiveFuels, Inc., et al.*, Superior Court for the State of California, Civil No. 488685, 2011 (Declaration, Report, Deposition).

*In re: Budeprion XL Marketing and Sales Practices Litigation*, Civil Action 2:09-CV-2811, MDL Docket No. 2017, 2011 (Declaration, Report, Deposition).

*In the Matter of CERTAIN COMPONENTS FOR INSTALLATION OF MARINE AUTOPILOTS WITH GPS OR IMU*, before the United States International Trade Commission, Investigation No. 337-TA-738, 2011 (Report).

*Convolve, Inc. v. Dell Inc., et al.*, United States District Court, Eastern District of Texas, Marshall Division, Case No. No. 2:08-cv-244, 2011 (Report, Deposition, Declarations, Trial Testimony).

Gregory K. Leonard

*Nicolosi Distributing, Inc. v. BMW of North America, LLC*, United States District Court, Northern District for California, Case No. CV-10-3256-SI, 2011 (Report).

*In the Matter of CERTAIN WIRELESS COMMUNICATION DEVICES, PORTABLE MUSIC AND DATA PROCESSING DEVICES, COMPUTERS AND COMPONENTS THEREOF*, before the United States International Trade Commission, Investigation No. 337-TA-745, 2011 (Report, Deposition).

*In the Matter of CERTAIN MOBILE DEVICES, ASSOCIATED SOFTWARE, AND COMPONENTS THEREOF*, before the United States International Trade Commission, Investigation No. 337-TA-744, 2011 (Report, Deposition).

*Oracle America, Inc. v. Google, Inc.*, United States District Court, Northern District for California, Case No. 3:10-CV-03561-WHA, 2011 (Declaration, Report, Deposition, Declaration).

*State of Alaska v. Jane Lubchenco, et al.*, United States District Court for the District of Alaska, Case No. Case No. 3:10-cv-00271-TMB, 2011 (Declaration).

*In the Matter of CERTAIN GAMING AND ENTERTAINMENT CONSOLES, RELATED SOFTWARE, AND COMPONENTS THEREOF*, before the United States International Trade Commission, Investigation No. 337-TA-752, 2011 (Report, Deposition, Declaration).

*General Atomics v. Paul Banks and TetraVue, Inc.*, Superior Court of the State of California, Case No. 37-2009-00084081-CU-BC-CTL, 2011 (Deposition, Trial Testimony).

*Apple Inc. and NEXT Software Inc. v. Motorola, Inc. and Motorola Mobility, Inc.*, United States District Court, Western District of Wisconsin, Case No. 10-CV-662 (BBC), 2011 (Report).

*Genentech, Inc. and City of Hope v. Glaxo Group, Limited, et al.*, United States District Court, Central District of California, Western Division, Case No. 2:10-CV-02764-MRP (FMOx), 2011 (Report, Rebuttal Report, Deposition).

*In the Matter of CERTAIN HANDHELD COMPUTING DEVICES, RELATED SOFTWARE, AND COMPONENTS THEREOF*, before the United States International Trade Commission, Investigation No. 337-TA-769, 2011 (Report, Supplemental Report, Deposition, Trial Testimony).

*In the Matter of CERTAIN EQUIPMENT FOR COMMUNICATIONS NETWORKS, INCLUDING SWITCHES, ROUTERS, WIRELESS ACCESS POINTS, CABLE MODEMS, IP PHONES, AND PRODUCTS CONTAINING SAME*, before the United States International Trade Commission, Investigation No. 337-TA-778, 2012 (Report, Deposition).

*Plantronics, Inc. v. Aliph, Inc.*, United States District Court for the Northern District of California, San Francisco Division, Case No. C09-01714 BZ, 2012 (Report, Deposition).



Gregory K. Leonard

*Commonwealth Scientific and Industrial Research Organization v. Lenovo, Inc., et al.*, United States District Court for the Eastern District of Texas, Tyler Division, Case No. 6:09-cv-00400-LED, 2012 (Report).

*Bayer HealthCare LLC v. Pfizer, Inc.*, United States District Court, Northern District of Illinois, Eastern Division, Civil Action No. 1:12-cv-00630, 2012 (Declaration).

## **Selected Merger Experience**

R.R. Donnelley/Meredith Burda (1990-1993): Merger of printing companies. Reviewed by the FTC. Preliminary Injunction Hearing. Part III Hearing.

Kimberly-Clark/Scott (1995): Merger of manufacturers of tissue products. Reviewed by the DOJ and the European Commission.

Staples/Office Depot (1996-1997): Proposed merger of office supply retailers. Reviewed by the FTC. Preliminary injunction hearing.

IMC/Western Ag (1997): Merger of mining companies. Reviewed by the DOJ.

Dow/Union Carbide (1999-2001): Merger of chemical manufacturers. Reviewed by the FTC.

Volvo/Scania (2000): Merger of truck manufacturers. Reviewed by the European Commission.

First Data/Concord (2003-2004): Merger of companies involved in merchant acquiring and payment networks. Reviewed by the DOJ.

Bumble Bee/Connors (2004): Merger of canned seafood manufacturers. Reviewed by the DOJ.

Sonaecom/Portugal Telecom (2006): Merger of telecommunications companies. Reviewed by the Portuguese Competition Authority.

Graphic Packaging/Altivity (2007-2008): Merger of paperboard manufacturers. Reviewed by the DOJ.

Inbev/Anheuser-Busch (2008): Merger of beer manufacturers. Reviewed by the DOJ, the UK Competition Commission, and MOFCOM.

Serta/Simmons (2009): Merger of mattress manufacturers. Reviewed by the FTC.

Coty/OPI (2010): Merger of nail polish manufacturers. Reviewed by the DOJ.

Gregory K. Leonard

Knowles/NXP (2011): Knowles acquired the speaker/receiver business of NXP. Reviewed by MOFCOM.

**Documents Reviewed  
In Connection with  
*Oracle America, Inc. v. Google Inc.*  
U.S. District Court, Northern District of California, San Francisco  
Case No. CV 10-03561 WHA**

**Deposition Transcripts**

- Iain Cockburn deposition transcripts dated October 17, 2011 and February 10, 2012.
- Alan Cox deposition transcript dated October 26, 2011.
- Gregory Leonard deposition transcript dated October 28, 2011.
- Christopher Plummer deposition transcript dated February 15, 2012.
- Dr. Mark Reinhold deposition transcript dated February 15, 2012.

**Expert Reports**

- Expert Reply Report of Professor Steven M. Shugan dated October 10, 2011, with accompanying exhibits.
- Reply Reports of Dr. Iain M. Cockburn dated October 10, 2011 and Expert Report dated February 3, 2012, and accompanying exhibits and appendices.
- Rebuttal Reports of Kenneth S. Serwin dated October 10, 2011, with accompanying exhibits.

**Legal Documents**

- Declaration of Steven M. Shugan in Support of Oracle's Reply Brief to Google Inc's Opposition to Motion to Exclude Portions of the Expert Reports of Gregory K. Leonard and Alan J. Cox dated November 1, 2011.
- Oracle America, Inc.'s Reply to Google Inc.'s Opposition to Motion to Exclude Portions of the Expert Reports of Gregory K. Leonard and Alan J. Cox dated November 1, 2011.
- Tentative Order Granting In Part and Denying in Part Google's Motion In Limine #3 to Exclude Portions of Dr. Cockburn's Revised Damages Report dated December 6, 2011.

**Appendix B**

- Request for Further Briefing Order by William Alsup, United States District Judge dated December 27, 2011
- Order Granting in Part and Denying in Part Google's Motion in Limine #3 to Exclude Portions of Dr. Cockburn's Revised Damages Report by William Alsup, United States District Judge dated January 9, 2012.
- Oracle America, Inc.'s Response to the Court's January 9, 2012 Order on Google Motion In Limine No. 3 (DKT. 685) dated January 17, 2012.
- Google's Memorandum Regarding Whether Dr. Cockburn Should Be Allowed to Submit a Third Damages Report dated January 17, 2012.
- Oracle America, Inc.'s Response to the Court's January 9, 2012 Order on Google Motion In Limine #3 (DKT 685) dated January 17, 2012.
- Google's Reply to Oracle's Response to the Court's January 9, 2012 Order on Google Motion In Limine #3 dated January 19, 2012.
- Oracle America, Inc.'s Reply to Google's Response to the Court's January 9, 2012 Order on Google Motion In Limine #3 (DKT. 685) dated January 19, 2012.
- Order Conditionally Allowing Dr. Cockburn A Third Damages Report by William Alsup, United States District Judge dated January 20, 2012.
- Oracle America, Inc.'s Response to Court Order of January 20, 2012 (DKT. No. 702) dated January 24, 2012.

**Literature and Articles**

- Achen, Christopher H., Interpreting and Using Regression, 1982.
- Berry, Steven, James Levinsohn, and Ariel Pakes, "Automobile Prices in Market Equilibrium," Econometrica, 1995.
- Chow, Gregory C., "Tests of Equality Between Sets of Coefficients in Two Linear Regressions," Econometrica, 1960.
- Gujarati, Damodar, Basic Econometrics, 2003.
- Hausman, Jerry, "Specification Tests in Econometrics," Econometrica, 1982.
- Stewart, Mark B. and Kenneth F. Wallis, Introductory Econometrics, 1981.

**Appendix B**

**Bates Numbered Documents Produced by Oracle America, Inc.**

- OAGOOGL0100030813-815

**Exhibit 2 (Revised)**  
**Project Armstrong Expected Profit Adjustments**  
**Reflects Patent Apportionment of 10.2%**

		<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>Total</u> <u>2007 - 2011</u>
		(1)	(2)	(3)	(4)	(5)	(6)
(a)	Expected Revenue (Sun's projections)	\$ 0	\$ 0	\$ 1,400,000	\$ 153,100,000	\$ 462,600,000	\$ 617,100,000
(b)	Adjusted Expected Revenue (based on Android shipments) <sup>1</sup>	0	0	631,692	69,079,980	208,728,927	278,440,599
(c)	Adjusted Expected Revenue (based on Red Hat share) <sup>2</sup>	0	0	331,407	36,241,743	109,506,402	146,079,552
(d)	COGS <sup>3</sup>	\$ 0	\$ 500,000	\$ 260,391	\$ 5,610,250	\$ 8,190,492	\$ 14,561,133
(e)	Operating Costs <sup>4</sup>	\$ 0	\$ 7,650,000	\$ 5,562,906	\$ 6,509,784	\$ 6,509,784	\$ 26,232,474
(f)	Expected Operating Profit	(c)-(d)-(e) \$ 0	\$ -8,150,000	\$ -5,491,890	\$ 24,121,709	\$ 94,806,127	\$ 105,285,945
(g)	Expected Operating Profit after Patent Apportionment	(f) * 10.2% \$ 0	\$ -831,300	\$ -560,173	\$ 2,460,414	\$ 9,670,225	\$ 10,739,166
(h)	Discount Period	1 50	2 50	3 50	4 50	5 50	
(i)	Discount Factor	1/(1+15%)^(h) 0 81	0 71	0 61	0 53	0 46	
(j)	NPV of Expected Operating Profit	(f) * (i) \$ 0	\$ -5,746,627	\$ -3,367,282	\$ 12,860,794	\$ 43,953,988	
(k)	<b>Total NPV of Expected Operating Profit</b>	<b>Σ(j) \$ 47,700,873</b>					
(l)	<b>Total NPV of Expected Operating Profit after Patent Apportionment</b>	<b>(k) * 10.2% \$ 4,865,489</b>					

Sources: "Project Armstrong: Business Model," February 2006, OAGOOGL0100166874 at 883 and 884

"Global Smartphone Sales Forecast by Operating System and Region," Strategy Analytics, January 2011

"Gartner Says Worldwide Operating System Software Market Grew to \$30.4 Billion in 2010," Gartner, April 27, 2011, <http://www.gartner.com/it/page.jsp?id=1654914>

"IDC: Linux Market to top \$1B in 2012, but Red Hat to face more competition," Triangle Business Journal, August 28, 2009, <http://www.bizjournals.com/triangle/stories/2009/08/24/daily63.html>

Notes: According to Dr. Cockburn, the expected Armstrong revenues start in late 2008 to correspond to actual Android sales

The expected operating profit is discounted to the date of the hypothetical negotiation, January 1, 2006 using a 15% annual discount rate

<sup>1</sup> Row (b) calculated by multiplying row (a) by 45%. The 45% is calculated by adjusting the FY2009 volume in OAGOOGL0100166874 at 883 to projected 2011 Android shipments from Strategy Analytics Report

<sup>2</sup> Row (c) calculated by adjusting proportionally Sun's expected share based on Red Hat's 33% share in total linux server market

<sup>3</sup> 2009-2011 COGS estimated by taking COGS as a percent of Expected Revenue from Sun's projections

<sup>4</sup> 2009-2011 operating costs estimated by taking operating costs as a percent of Expected Revenue from Sun's projections

**Exhibit 3a (Revised)**  
**Royalties**  
**Danger's and Handset Manufacturers' Java ME Licenses**  
**January 2008 - September 2011**

Scenario 1									
Royalty (1)	Sales of All Models of Android (U.S.)			Sales of Accused Models Only			Sales of Accused Models Only (After July 20, 2010)		
	Units (2)	Royalties (3)	Apportionment <sup>1</sup> (4)	Units (5)	Royalties (6)	Apportionment <sup>1</sup> (7)	Units (8)	Royalties (9)	Apportionment <sup>1</sup> (10)
Danger Royalty (Scenario 1) <sup>2</sup>	77,028,772	\$ 30,717,282	\$ 4,247,348	17,329,883	\$ 10,112,855	\$ 1,842,697	12,036,615	\$ 6,682,856	\$ 1,442,397
OEM Royalty <sup>3</sup>	77,028,772	30,262,687	3,531,824	17,329,883	7,222,442	842,899	12,036,615	5,619,966	655,881
<b>Total:</b>		<b>\$ 60,979,969</b>	<b>\$ 7,779,172</b>		<b>\$ 17,335,297</b>	<b>\$ 2,685,596</b>		<b>\$ 12,302,822</b>	<b>\$ 2,098,278</b>

Scenario 2 (Danger Royalty Doubled)									
Royalty (1)	Sales of All Models of Android (U.S.)			Sales of Accused Models Only			Sales of Accused Models Only (After July 20, 2010)		
	Units (2)	Royalties (3)	Apportionment <sup>1</sup> (4)	Units (5)	Royalties (6)	Apportionment <sup>1</sup> (7)	Units (8)	Royalties (9)	Apportionment <sup>1</sup> (10)
Danger Royalty (Scenario 2) <sup>4</sup>	77,028,772	\$ 60,684,564	\$ 7,744,696	17,329,883	\$ 19,475,710	\$ 2,935,394	12,036,615	\$ 12,615,712	\$ 2,134,794
OEM Royalty <sup>3</sup>	77,028,772	30,262,687	3,531,824	17,329,883	7,222,442	842,899	12,036,615	5,619,966	655,881
<b>Total:</b>		<b>\$ 90,947,251</b>	<b>\$ 11,276,520</b>		<b>\$ 26,698,152</b>	<b>\$ 3,778,293</b>		<b>\$ 18,235,678</b>	<b>\$ 2,790,676</b>

**Sources:** Sales of All Models of Android (U.S.) from "Worldwide Quarterly Mobile Phone Tracker, 2Q 2011 Final & Forecast Data Cuts - NERA," IDC Research, Inc., September 8, 2011.  
Sales of Accused Models Only from Google's Activation Data for Accused Models, received from the client on September 29, 2011.  
Sun/Oracle Java ME Licensing Agreements.

**Notes:**

- <sup>1</sup> I conservatively use Dr. Cockburn's apportionment percentage of 10.2% with an upward adjustment to account for technical and engineering support.  
See Cockburn February 3, 2012 Report, ¶414.
- <sup>2</sup> See Leonard October 3, 2011 Report, Exhibit 3b.1.
- <sup>3</sup> See Leonard October 3, 2011 Report, Exhibit 3c.
- <sup>4</sup> See Leonard October 3, 2011 Report, Exhibit 3b.2.